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Short reports

Evaluation of an objective structured clinical examination

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SUMMARY An objective structured clinical examination (OSCE) was introduced at the end of the fourth year undergraduate paediatric training. We have compared the results obtained with those of our traditional method of assessment. We feel that the OSCE is a valid and reliable assessment; it provided good feedback and was well received by the students.

The objective structured clinical examination (OSCE) is said to provide a valid and reliable means of student assessment.[1 2] It also enables a large number of students to be examined in a fairly short time and provides valuable feedback both for students and teachers.[3 4]

Traditionally we assess students at the end of their 9-week fourth year paediatric training module by means of tutor reports, project marks, multiple-choice questions (MCQ), and viva results. The students are graded as category A (honours potential), B (good average), C (ordinary), D (unsatisfactory), E (very unsatisfactory). Our students also receive 2 weeks' tuition in their fifth year revision term. The final examination consists of an MCQ examination, a long case, short cases, and oral examination with a grading system of A (honours recommendation), B (good pass), C (bare pass), D (fail), E (bad fail).

At present the fourth year assessment is used irregularly for grading students in the final examination. There are about 270 students to be taught and examined and several teaching units are used so that assessment of each group of students varies. Both the fourth year and final assessments tend to be norm-referenced.[5] A criterion-referenced method—such as an OSCE—in which the specific objectives are set in advance should improve the reliability of student assessment.

We therefore used an objective undergraduate clinical examination in child health as described by Waterston *et al.*[3] and compared the results with those derived from our more traditional method of assessment.

Methods

The students moved round 20 stations (Table 1) and the examination lasted 84 minutes. Four clinical stations (the one concerned with history taking was duplicated) and 5 examiners were used; each examiner was provided with a check list for his station to score each candidate. Two mothers of children recently admitted to hospital—for example with convulsions, vomiting, or wheezing—each reproduced the history of the event to half the group in alternating sequence. Two or 3 patients with similar physical signs stood by at each station lest there should be patient fatigue and boredom. This was particularly necessary in the case of healthy infants in the routine examination. Seventeen students could be examined as one group using a 20 station OSCE format.

Sixty per cent of the marks in the OSCE were allocated to the 8 clinical examinations and related

Table 1 *Format of OSCE*

Station	*Procedure (4 min per station, 7 min history taking)*
1A (half class)	Take a history from this mother whose child was recently admitted to hospital
1B (half class)	Take a history from this mother whose infant was recently admitted to hospital
2A	Questions on 1A
2B	Questions on 1B
3	Examine the respiratory system of this child
4	Questions on 3
5	Examine the cardiovascular system of this child
6	Questions on 5
7	Perform a routine newborn examination on this infant
8	Questions on neonatal problems
9	Examine the specimen of urine provided and answer the questions
10	Rest
11	Examine the laboratory report and answer the questions
12	Examine the CSF report and answer the questions
13	Examine the *x*-ray film and answer the questions
14	Examine the slide and answer the questions
15	Examine the slide and answer the questions
16	Examine the haematology report and answer the questions
17	Examine the *x*-ray film and answer the questions
18	Examine the growth chart and answer the questions
19	Examine the prescription sheet and answer the questions
20	Rest

stations. The remaining marks were allocated to short answer questions used in the 10 data interpretation stations.

The fourth year training module grading of each student is the result of a consensus view and takes into account clinical and senior tutor reports, project marks, MCQ results, and a 10-minute oral examination by one of us (IBH). This grading was assigned without knowledge of the results of the OSCE examination.

The OSCE results obtained from a total of 67 students were used to determine a mean and standard deviation (SD) score. We empirically delineated OSCE categories A to E so as to compare them with our traditional grading system.

Traditional grading	*OSCE score*
Category A (honours potential)	Greater than mean+1 SD
Category B (good average)	From mean to +1 SD
Category C (ordinary)	From mean to −1 SD
Category D (unsatisfactory)	From −1 to −2 SDs
Category E (very unsatisfactory)	Lower than mean −2 SDs

A retrospective analysis of the whole group was then carried out to determine the percentage of students that would be allocated to each category using the traditional method and the OSCE grading.

Results

The OSCE results followed a normal distribution curve with a mean (±SD) of 62 (±8%) (range 45 to 84). The percentage of students allocated to each category by the traditional method and by OSCE grading was as shown in Table 2; the mean (±1 SD) OSCE scores for each traditional category were: A 76 (±6), B 63 (±6), C 60 (±7), D 51 (±8).

Sixty-nine per cent of students found the OSCE an extremely useful/useful learning exercise, 25% had no opinion, and 6% found it of little use/complete waste of time. Eighty per cent felt it should be an important part of their assessment.

Table 2 *Comparison of the traditional method of assessment with the OSCE in 67 students*

Category	*Traditional assessment method (%)*	*OSCE (%)*
A	10	13·5
B	35	38
C	49	30
D	6	13·5
E	0	5

Discussion

We have been impressed by the comparative objectivity and flexibility of the OSCE. There is no doubt that students learn best those subjects on which they are to be examined. The OSCE encourages them to practise the basic skills of history taking, examination, and simple tasks—such as urine analysis. The examination provided both student and teacher with valuable information and we were able to identify areas of ignorance and poor teaching.

It is difficult to compare the two types of assessments. To make such a comparison we converted 'criterion-referenced' OSCE scores into 'norm-referenced' traditional grades and achieved an acceptable distribution for the 5 categories (Table 2). This should make it easier to identify candidates who are likely to attain honours and those who are likely to fail. The more objective nature of the OSCE may well help to remedy the current variation in assessments from different units within our own department where, for example, the percentage of A grades varies from 10 to 24%. Although there was a correlation between the OSCE scores and traditional categories, there was only 55% concordance in the final grading of students with the two methods. In only 5% of cases however, was there major discordance (a difference of two grades) between the two assessment methods. Most of the discordance was in favour of grading upwards by the traditional method. The subtlety of deciding whether a student is good average (B) or ordinary (C) is stressed by the negligible difference between OSCE marks and suggests that these two categories should be amalgamated.

In future we intend to use the end of module fourth year assessment results as part of our final examination in child health and hence the OSCE results should provide a more reliable method if used throughout the department; this fact should soon be recognised by the students.

The OSCE was well received by the students who found it a useful learning exercise: 80% of the respondents felt that it should be an important part of their assessment.

Preparation of the examination was time consuming at first but the advantages to students, staff, and patients made it well worth the effort. We hope to use this type of assessment in the final examination in child health.

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Pneumococcaemia complicated by meningitis

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SUMMARY Meningitis developed in 3 of 14 children with occult pneumococcaemia; in 2 of them it developed while they were being treated with low doses of intravenous penicillin, in the third child it developed at a time when he was not being treated. All children with occult pneumococcaemia should be treated with intravenous penicillin as are those with pneumococcal meningitis.

Unsuspected pneumococcal bacteraemia is not uncommon in febrile children who have no focus of infection.[1–4] Such children are generally aged between 6 and 24 months, have a temperature of $\geq 38{\cdot}9°C$, and leucocytosis $\geq 15 \times 10^9/l$. Some of them present with febrile seizures. Pneumococcaemia responds well to intravenous penicillin; spontaneous resolution has been described.[1–4] However there is the risk of developing meningitis.

We report 14 cases of occult pneumococcaemia in children. Meningitis developed in 2 of them despite the fact that they were being treated with intravenous penicillin, and it also developed in a third child who was not being given antibiotics.

Subjects and results

Fourteen children were admitted to Turku University Hospital or Aurora Hospital, Helsinki, during 1977–81 with a high temperature but no focus of infection. Two principal symptoms were febrile convulsions and abdominal pains. Pronounced leucocytosis was present in most of them. Twelve children remained in hospital and 2 returned home, one of whom was readmitted two days later.

Blood and spinal fluid were obtained for culture in all patients. This was done routinely at presentation in hospital. *Streptococcus pneumoniae* was identified using routine laboratory methods. All strains were sensitive to penicillin.

Three children developed meningitis. In each the first spinal fluid sample taken on admission contained fewer than $4{\cdot}0 \times 10^6/l$ leucocytes and had no bacterial growth. One 4½-year-old girl (Case 1) was sent home, but she returned 3 days later with pneumococcal meningitis. She was treated with intravenous penicillin (450 000 U/kg a day) and sulphafurazole (150 mg/kg a day). Unilateral deafness was observed later. The 2 other children (Cases 2 and 3) were initially given intravenous penicillin (100 000 U/kg a day). This treatment was started one (Case 2) day and two (Case 3) days after the onset of symptoms. Despite this fever recurred and neck rigidity developed a day or two later. Case 2 had no bacterial growth in the repeat spinal fluid sample but a greatly increased number of leucocytes was recorded. He was treated with intravenous penicillin (1 000 000 U/kg a day) combined with sulphafurazole (150 mg/kg a day). Case 3 had pneumococcal growth in the second spinal fluid sample and the dose of penicillin was increased to 600 000 U/kg a day. Both children made good recoveries without any sequelae (Table).

Discussion

Twenty children have been reported in whom meningitis developed after detection of occult pneumococcaemia.[2–4] In 5 of them, meningitis developed during oral or low-dose parenteral antibiotics. Our study confirms these observations.